

## WHAT IS CLAIMED IS:

1. Process for the treatment of wooden elements, said process comprising the following steps:

- 5           a) conditioning said wooden elements to reduce their moisture content; and
- b) performing one of the following sequences of steps selected from the group consisting of at least the sequence of steps b1) to b4) or at least the sequence of steps bb1) to bb2);

said sequence of steps b1) to b4) at least comprising:

- 10           b1) impregnating the wooden elements obtained from step a) with at least one wood preservative,
- b2) heating the wooden elements obtained from step b1) at a temperature of at least 51° C, to fix said wood preservative(s) in said wooden elements;
- 15           b3) impregnating the wooden elements obtained from step b2) with a solution comprising polymerizable reactive groups, identical or different, that can form a polymer under polymerizing condition, and
- 20           b4) subjecting the wooden elements obtained from step b3) to polymerizing condition to polymerize said reactive group(s);

said sequence of steps bb1) to bb2) at least comprising:

- 25           bb1) impregnating the wooden elements obtained from step a) with a mixture comprising at least one wood preservative and polymerizable reactive groups, identical or different, that can form a polymer under polymerizing condition, and
- bb2) heating the wooden elements obtained from step bb1) at a temperature of at least 51°C to fix the wood preservative(s) and to polymerize said reactive groups.

2. Process according to claim 1, characterized in that it comprises the following steps:

a) conditioning said wooden elements to reduce their moisture content; and

b1) impregnating the wooden elements obtained from step a) with at least one wood preservative,

b2) heating the wooden elements obtained from step b1) at a temperature of at least 51° C, to fix said wood preservative(s) in said wooden elements,

b3) impregnating the wooden elements obtained from step b2) with a polymerizing solution comprising reactive groups, identical or different, that can form a polymer under polymerizing condition, and at least one wood preservative, identical or different than the one of step b1)

b4) subjecting the wooden elements obtained from step b3) to polymerizing condition to polymerize said reactive group(s).

3. Process according to claim 1, characterized in that it comprises the following steps:

bb1) impregnating the wooden elements obtained from step a) with a mixture comprising at least one wood preservative and polymerizable reactive groups, identical or different, that can form a polymer under polymerizing condition, and

bb2) heating the wooden elements obtained from step bb1) at a temperature of at least 51°C to fix the wood preservative(s) and to polymerize said reactive groups.

4. Process according to claim 2, wherein the impregnation step b1) is carried out with a solution containing up to 2.5% of wood preservative.

5. Process according to claims 2 or 4, wherein the impregnation step b3) is carried out with a solution containing 5 to 12% of polymerizable reactive groups having a reactive double bond or issued from a compound having a reactive double bond.

6. Process according to claim 5, wherein the solution of step b3) further comprises from 0.04 to 0.12% of the wood preservative of step b1).

7. Process according to claim 3, wherein the impregnation step bb1) is carried out with a solution comprising from 2 to 5% of polymerizable reactive groups having a reactive double bond or issued from a compound having a reactive double bond, 2.0% or more of wood preservative.

8. Process according to any of claims 2 and 4 to 6, characterized in that it further comprises between steps b2) and b3), a cooling step of the wooden elements.

9. Process according to claim 8, characterized in that said cooling step is carried out till said wooden elements reach a temperature of 30°C or less in their 25 mm outer portion.

5 10. Process according to claim 9, characterized in that the cooling step is carried out for a period of at least 1 to 12 hours.

11. Process according to any of claims 1 to 10, characterized in that it further comprises after step b4) or bb2), a drying steps of the wooden elements obtained from steps b4) or bb2).

10 12. Process according to any of claims 1 to 11, characterized in that the wood preservative is a water-borne wood preservative.

13. Process according to claim 12, characterized in that the water-borne wood preservative is selected from the group consisting of Ammoniacal Copper Quat., copper azole, Ammoniacal Copper Arsenate and Chromated Copper Arsenate.

15 14. Process according to any of claims 1 to 4, 6 and 8 to 13 characterized in that said reactive groups of the polymerizable solution have a reactive double bond or are issued from a compound having a reactive double bond.

20 15. Process according to claims 5, 7 or 10, characterized in that reactive groups are selected from the group consisting of allyl group, vinyl group, acrylate group, methacrylate group and polymers comprising at least one group selected from the group consisting of allyl group, vinyl group, acrylate group and methacrylate group.

16. Process according to claim 15, characterized in that said reactive groups are polyethylene glycol diacrylate or polyethylene glycol dimethacrylate.

25 17. Process according to claim 16, characterized in that said reactive groups are polyethylene glycol diacrylate or polyethylene glycol dimethacrylate, having a molecular weight comprised between 600 and 10000 daltons.

18. Process according to any of claims 1 to 17, characterized in that the moisture content of the wooden element obtained from step a) is comprised between 15 and 35%.

19. Process according to claim 18, characterized in that the moisture content of the wooden element obtained from step a) is comprised between 24 and 26%.

20. Process according to any of claims 1 to 19, characterized in that the drying step a) is of the type selected from the group consisting of kiln drying, air drying and air seasoning.

5 21. Process according to any of claims 1 to 20, characterized in that the amount of wood preservative impregnated in the wooden elements is superior or equal to  $9.6 \text{ kg/m}^3$ , according to a standardized assay zone for analytical purposes as defined in CSA-O80 and AWPAC-4 standards.

10 22. Process according to any of claims 1 to 21, characterized in that the amount of polymerizable reactive groups impregnated in at least 13 mm outer portion of the wooden elements is comprised between 10 and  $40 \text{ kg/m}^3$  of wooden elements.

23. Treated wooden elements whenever obtained according to the process of any of claims 1 to 22.

15 24. Use of treated wooden elements as defined in claim 23, characterized in that they are part of a distribution network for electrical or telecommunications purposes.